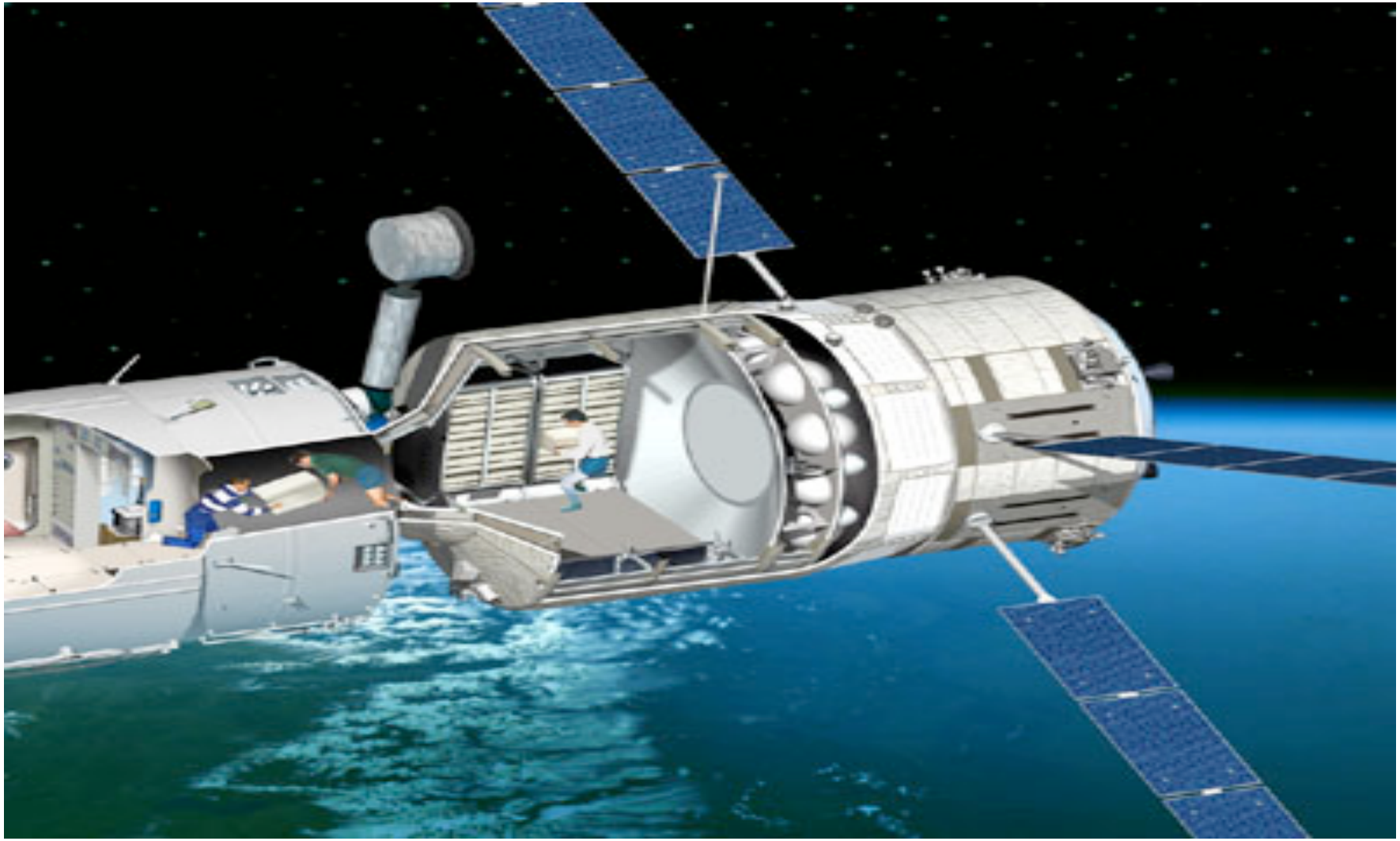
InSPACE-2

ATV-1 Manifest Candidate with Launch NET July 25, 2007



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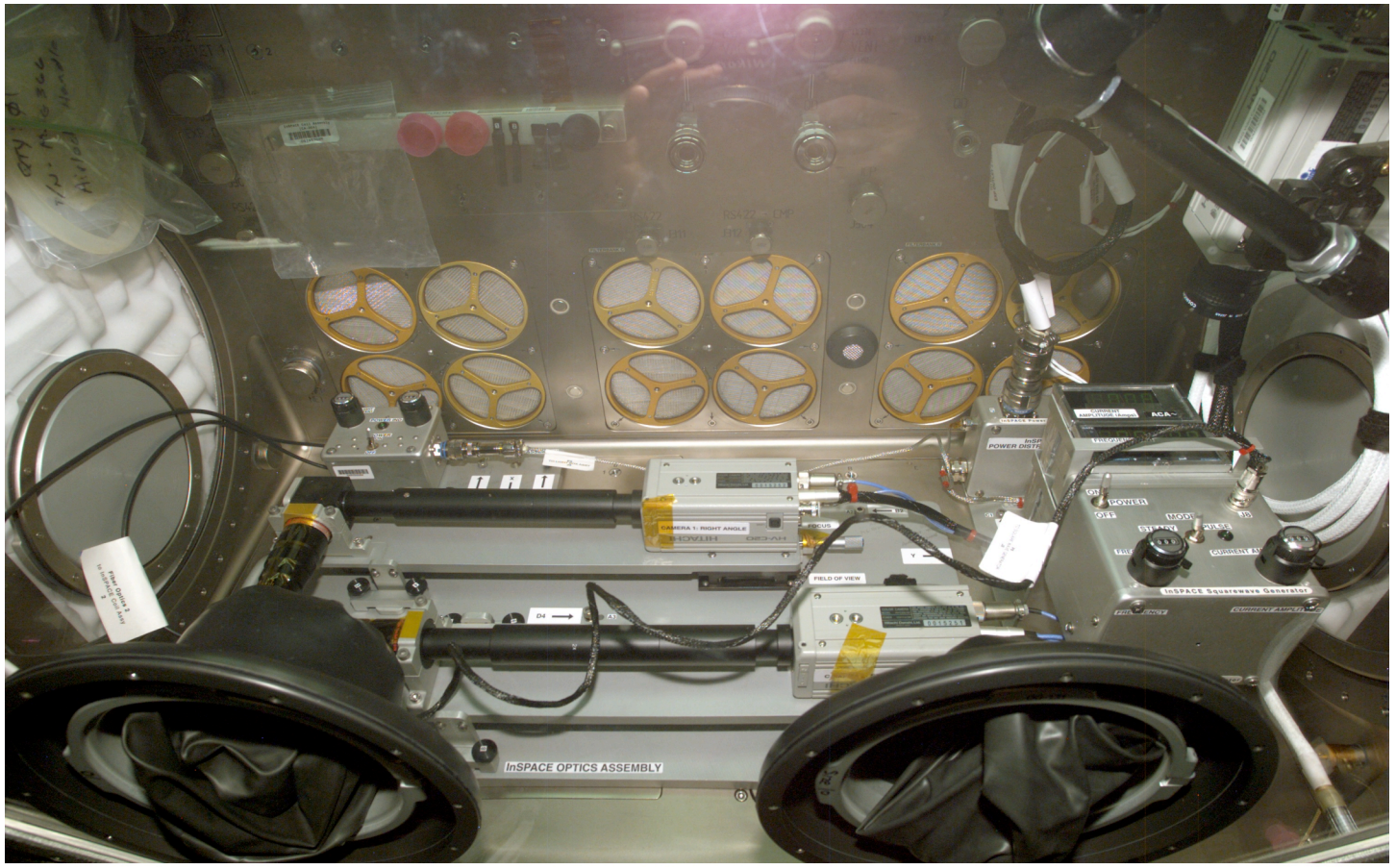
The InSPACE and InSPACE-2 experiment common hardware consists of the: Optics Assembly, Avionics Assembly, Light Box Assembly, Interface Power Cable.



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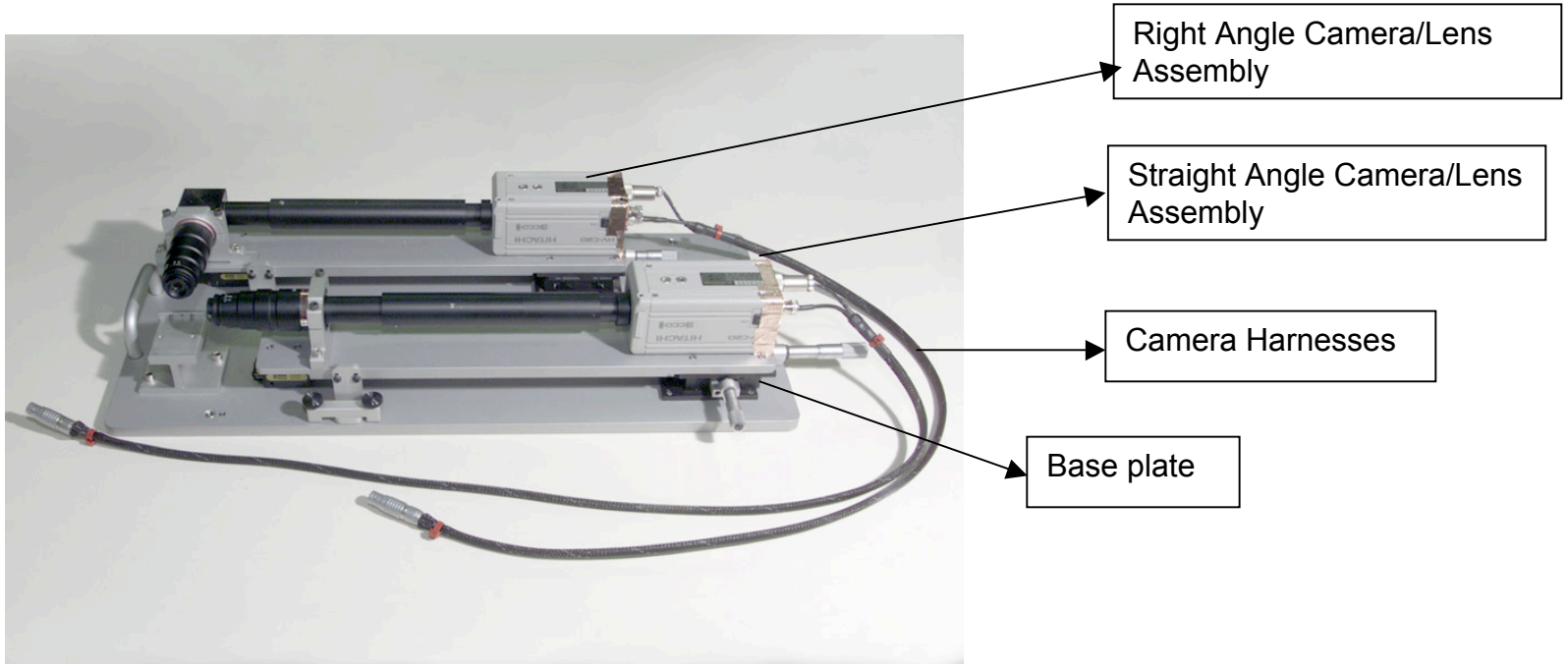
InSPACE hardware mounted in the MSG onboard the ISS
(Increment 6/7 Operations)

The Optics Assembly

The right and straight angle camera/lens assembly uses MSG provided Hitachi HV-C20 CCD cameras, a c-mount micro-video zoom objective lens with a 90 right angle optical beam bender, and an x-y translator stage for camera alignment.

Camera power cables as well as composite and s-video are connected through the MSG video drawer.

An aluminum plate supports the optics and coil assembly while attaching to the VW of the MSG.

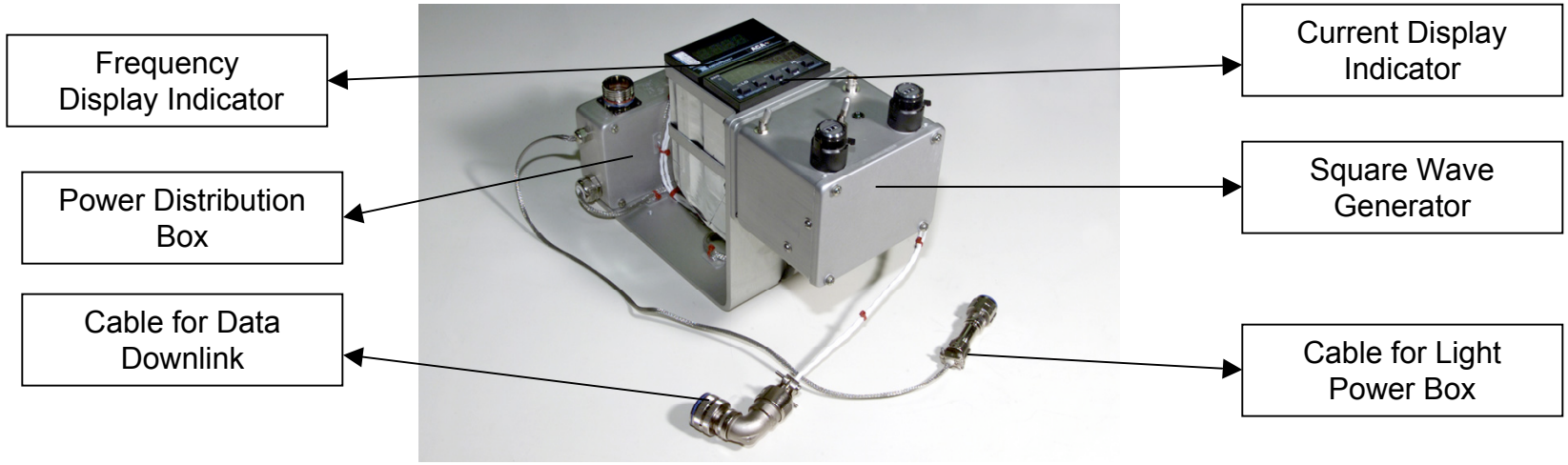


Avionics Assembly

The Square Wave Generator (SWG) energizes the Coil Assembly. The SWG provides the crew with the capacity to manually control the frequency induced into the coil from 2,10, and 20 Hz and the current induced into the coil from 0 to 1.2 Amps. The SWG also provides the capability to switch from a DC field to a pulsed DC field and requires +5 / -12 VDC.

The Power Distribution Box distributes the power provided by MSG to all the InSPACE instrumentation and avionics packages. This includes + 5,- 12, and + 28VDC.

The Frequency and Current digital meter measures and displays what is set by the crew and induced in the coil. It also provides an analog signal to the MSG for downlink.

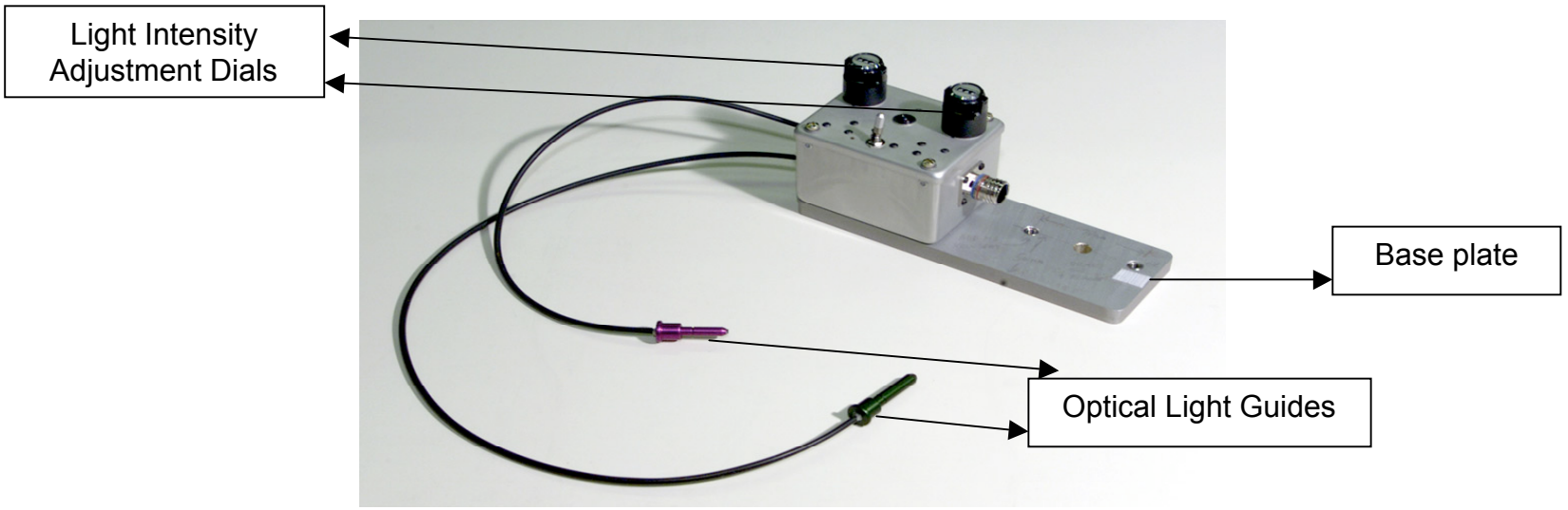


Light Box Assembly

The Light Box Assembly contains 2 green LEDs with less than 300 mW total power draw and 2 control dials for adjusting light intensity. There are two 2mm fiber optic wands connected to the assembly. These wands are terminated with fiber optic guides that are inserted into the assembly.

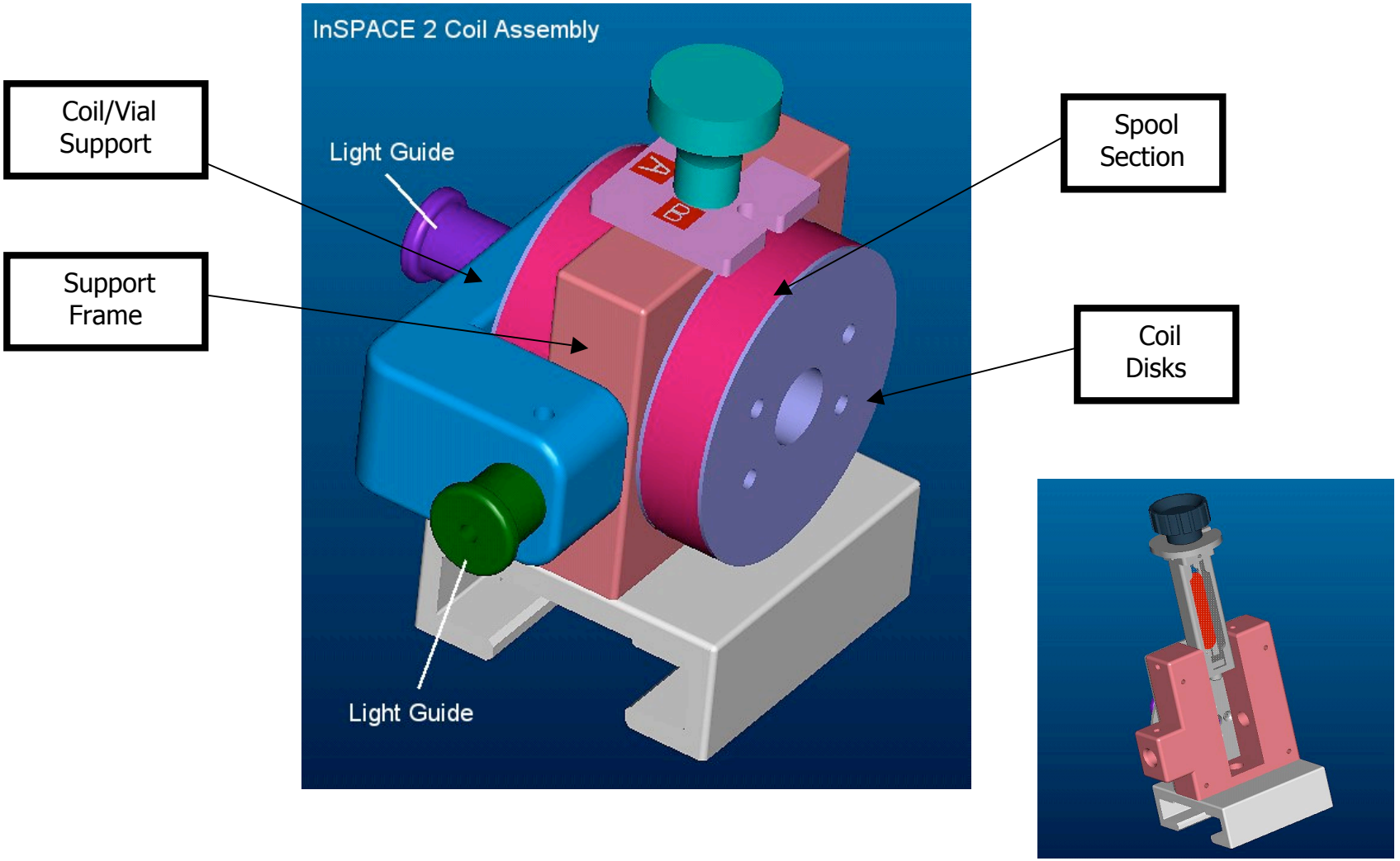
This system provides backlighting for imaging the MR fluid during the experiment. The fibers fit into a machined optical light guide held in place with a ball détente.

The light box assembly also has a base plate for mounting to the WV of the MSG.



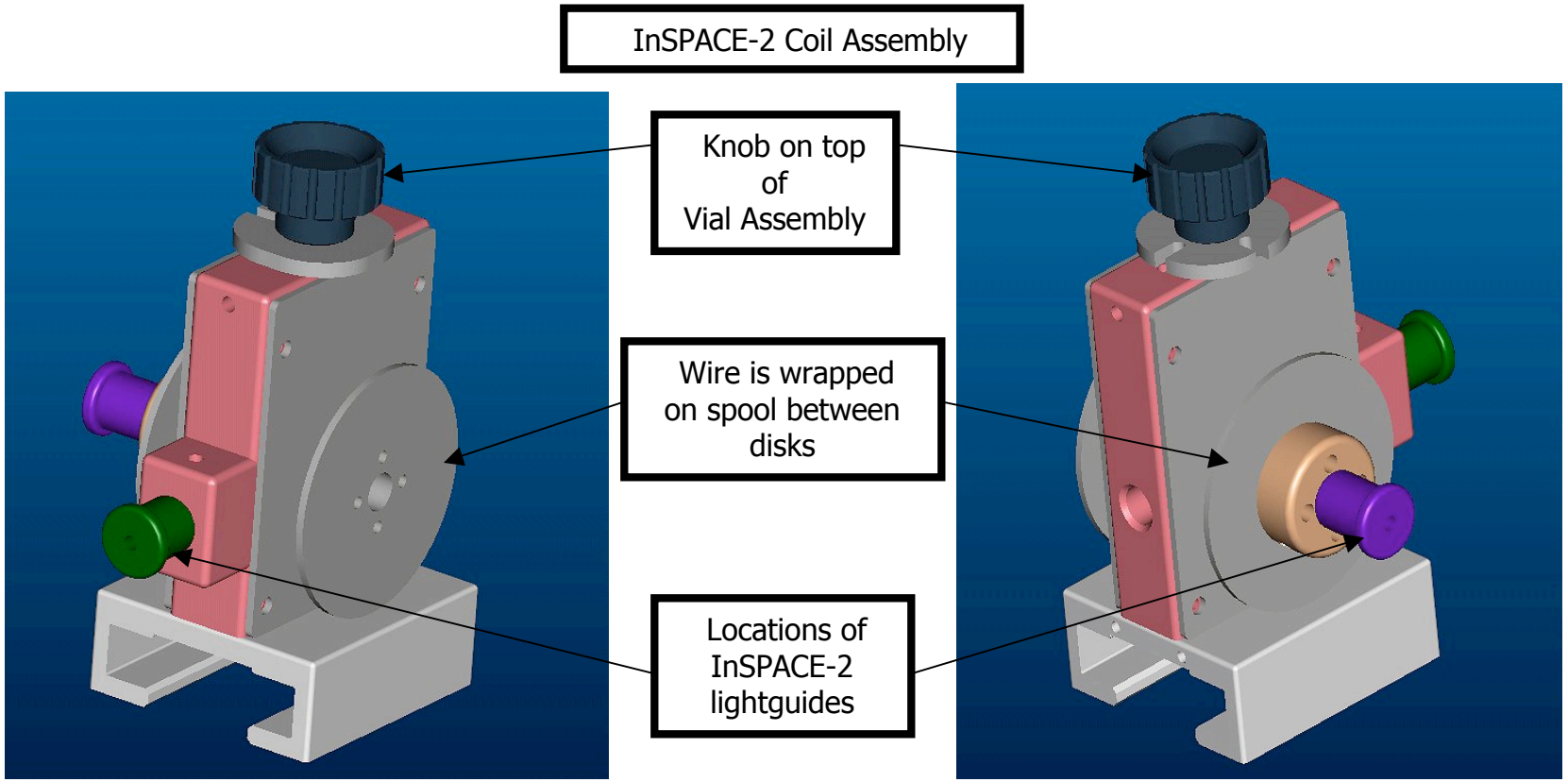
InSPACE-2

InSPACE-2 Hardware for ATV-1



InSPACE-2

InSPACE-2 Hardware for ATV-1



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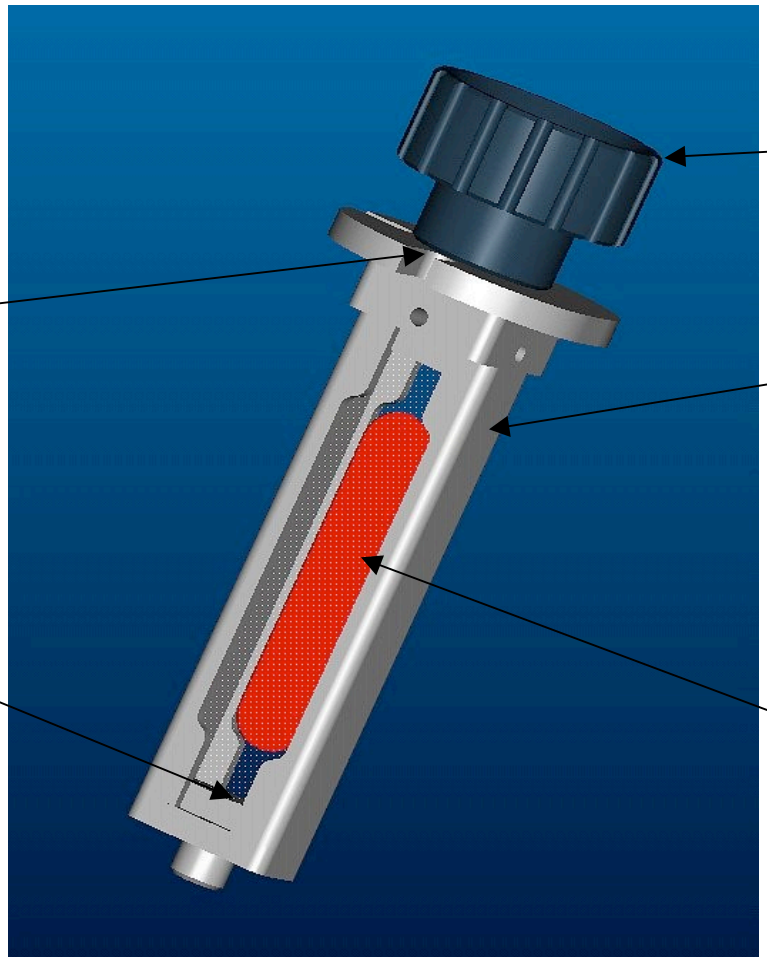
InSPACE-2 Vial Assembly



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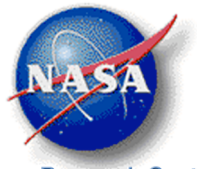
Payload Integration Overview ATV-1 (L-11) Milestones

InSPACE-2

- Payload hardware processed and manifest approved (L-6 to L-4)
- Payload hardware drawings (L-4 to L-3)
- Payload safety certification data submittal (L-6 to L-4)
  - Safety Data Package approved by PSRP
  - JSC Form 476 Cargo Item Ground Safety Checklist
    - JSC Form 879 Safety Certification Compliance
    - JSC 522 Hazard Report Form
- Coordination between PD/ ESA Curator (L-4 to L-3)
- Shipping to ESA-French Guiana through JSC and Bench Review (L-3 to L-1)
- Physical Integration within Launch Vehicle (L-1 to L-0)



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Microgravity Science Glovebox
InSPACE-2

- MSG Interface Verifications complete 12/2004
- HFIT baselined 12/2004
- Offgassing completed 12/2004
- InSPACE-2 crew procedures updated and verified 12/2005
- Vibration testing currently being evaluated based on ATV-1 PIRN 57008 and IDD 2/2007

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Hardware for ATV-1
InSPACE-2

- 2 new Coil Assemblies
  - Fabricated, assembled, tested
- 8 new Vial Assemblies (.32ml)
  - Fabricated 4 flight and 4 spares, tested
  - Fabricate fresh vial assemblies at L-8
- Video Tapes
  - Mini DV (54 for nominal ops)
  - Hi8mm (9 for nominal ops)
- Soft Stowage Container and Cushioning
  - Total Hardware Upmass = 3.57kg
  - <10kg stowed in cargo transfer bags (CTBs)
  - Coordinated with MSFC/JSC

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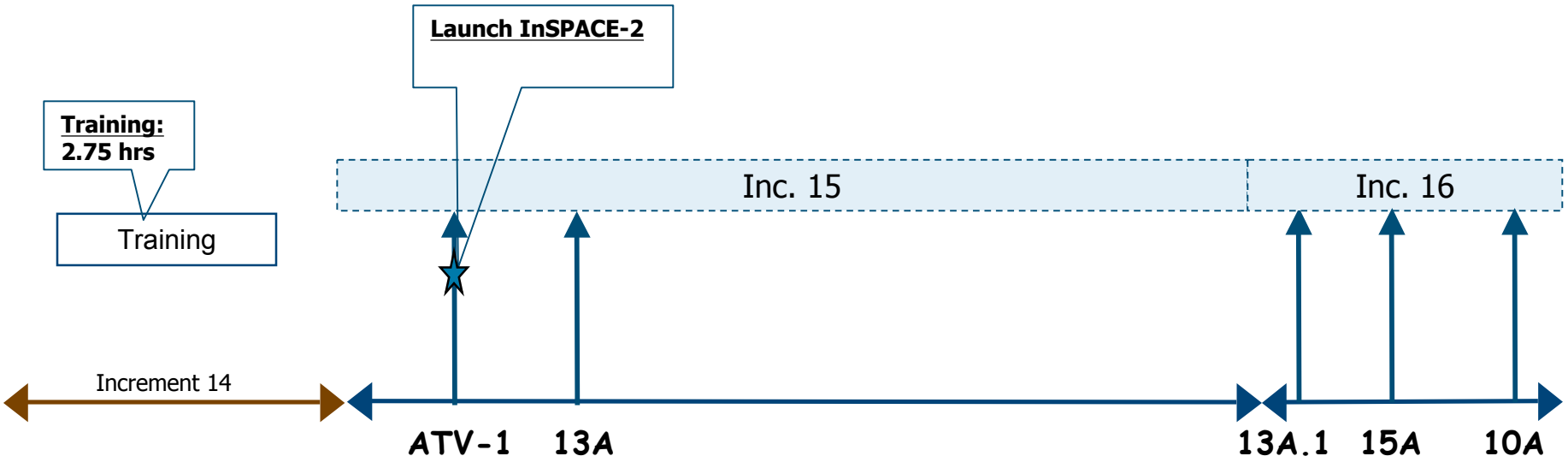

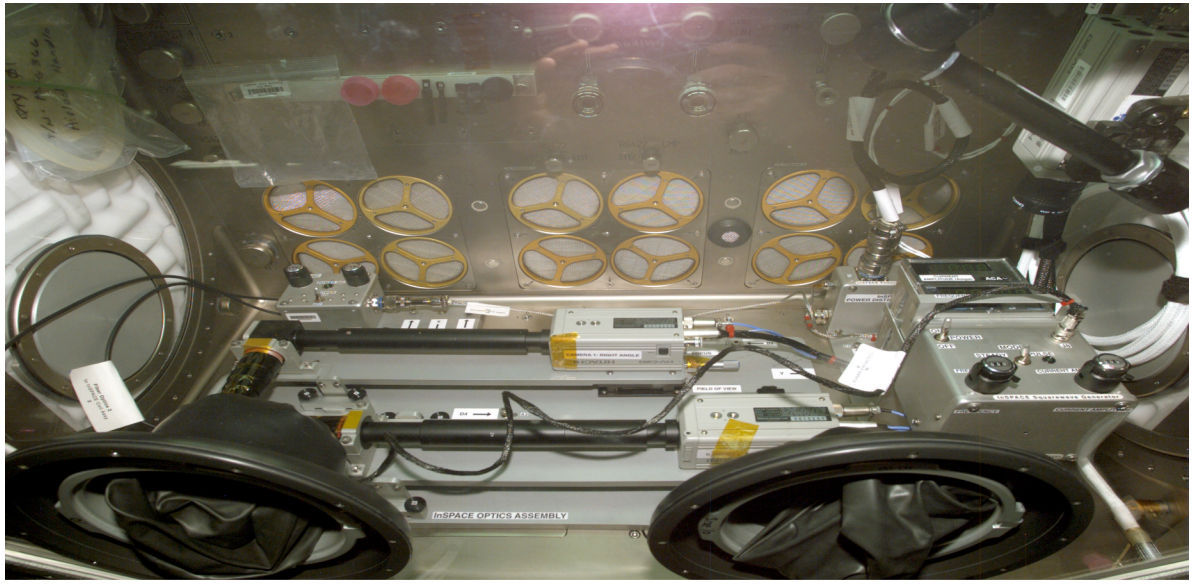

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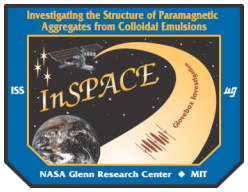
InSPACE inside MSG

Mass (Kg)	3.57
Volume (M^3)	0.011
Max Power (kW)	0.030
Crew Time (Hrs)	14
Total Operations (Hrs)	28

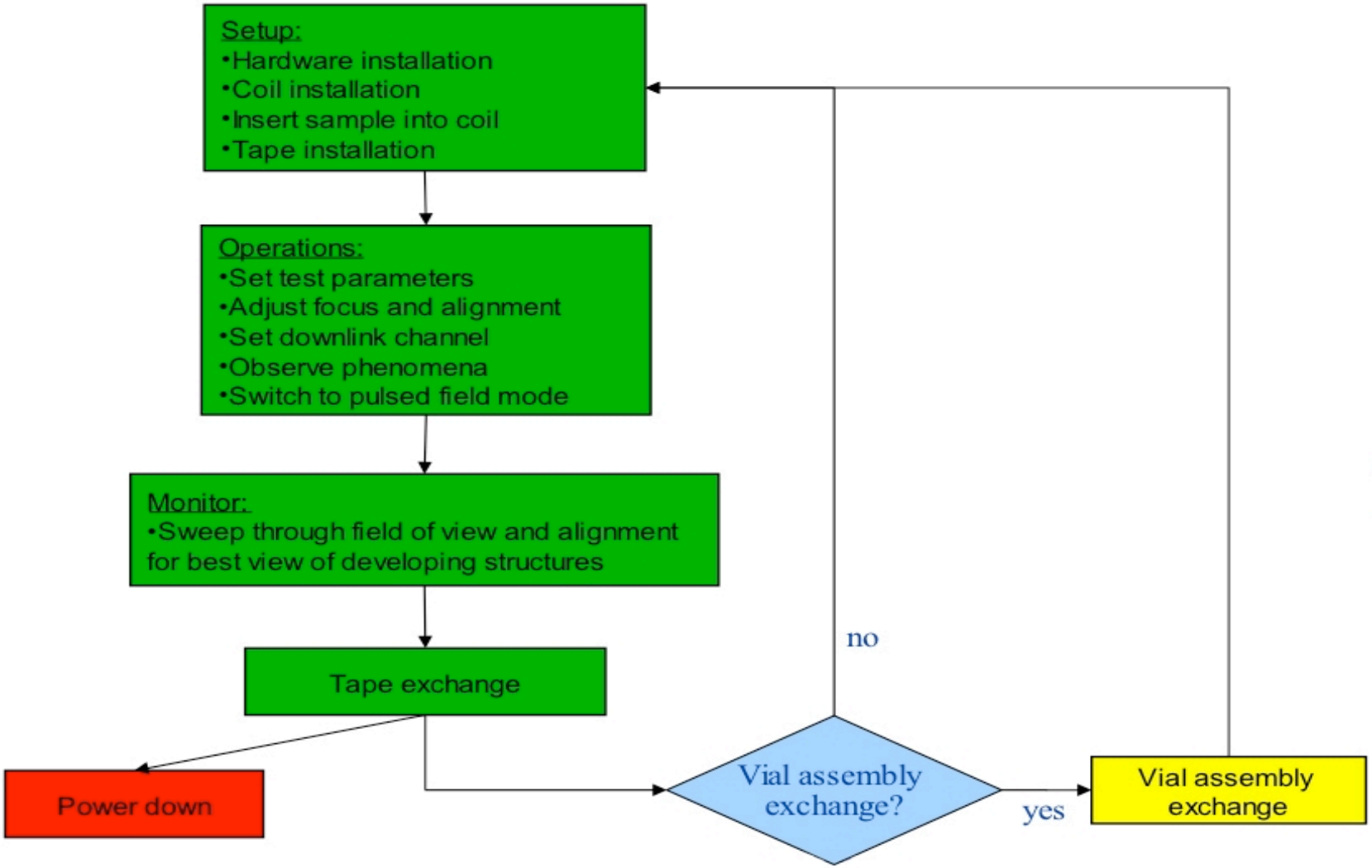


Payload Operations Overview
InSPACE-2

- InSPACE is non-automated and has no ground commanding capabilities for InSPACE experiment (except for the MSG video drawer)
- There are 12 experiment runs (1 – 2 hours/run)
- Four vial assemblies
- Required crew time.
  - 90 minutes for initial set up.
  - 15 minutes for coil change out.
  - 60 minutes for de-activation and stowage.

InSPACE-2

InSPACE Operations Overview



PAYLOAD OPERATIONS OVERVIEW

Science Test Matrix

0.40% by volume	1000 A/m		2, 10, 20 Hz
	1500 A/m		2, 10, 20 Hz
	2000 A/m		2, 10, 20 Hz
0.48% by volume	1000 A/m		2, 10, 20 Hz
	1500 A/m		2, 10, 20 Hz
	2000 A/m		2, 10, 20 Hz
0.57% by volume	1000 A/m		2, 10, 20 Hz
	1500 A/m		2, 10, 20 Hz
	2000 A/m		2, 10, 20 Hz
0.65% by volume	1000 A/m		2, 10, 20 Hz
	1500 A/m		2, 10, 20 Hz
	2000 A/m		2, 10, 20 Hz